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IS 11480 (1998): Domestic grillers for use with liquefied petroleum gases [MED 23: Domestic and Commercial Gas Burning Appliances]



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**IS : 11480 - 1985**

***Indian Standard***

**SPECIFICATION FOR  
DOMESTIC GRILLERS FOR USE WITH  
LIQUEFIED PETROLEUM GASES\***

UDC 683.955.1 : 662.767



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**INDIAN STANDARDS INSTITUTION**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

**Gr 5**

*August 1986*

**AMENDMENT NO. 1 JULY 2004  
TO  
IS 11480 : 1998 DOMESTIC GRILLERS FOR  
USE WITH LIQUEFIED PETROLEUM GASES —  
SPECIFICATION**

**( *First Revision* )**

**( Page 2, clause 14.2 )** — Insert the following new clause after **14.2**:

**'14.3** The size of the pie dish may be as agreed to between the manufacturer and the purchaser.'

**(MED 23)**

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Reprography Unit, BIS, New Delhi, India

*Indian Standard*

**SPECIFICATION FOR  
DOMESTIC GRILLERS FOR USE WITH  
LIQUEFIED PETROLEUM GASES**

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( *Continued on page 2* )

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# *Indian Standard*

## SPECIFICATION FOR DOMESTIC GRILLERS FOR USE WITH LIQUEFIED PETROLEUM GASES

### 0. F O R E W O R D

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 25 September 1985, after the draft finalized by the Domestic and Commercial Gas Burning Appliances ( Pressure Type ) Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

**0.2** While preparing this standard assistance has been derived from BS 5314 : Part 3 : 1976 Specification for gas heated catering equipment : Part 3 Grillers and toasters, issued by British Standards Institution.

**0.3** This standard is one of a series of Indian Standards on various domestic and commercial gas burning appliances ( pressure type ), used with LPG. General requirements of these equipment are covered in IS : 5116-1985\* which is a necessary adjunct to this standard. Should, however, any deviation exists between the requirements given in IS : 5116-1985\* and those of this standard, provisions of the latter shall apply.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard specifies construction, operation, safety requirements and tests for domestic grillers with or without boiling burners for burning gases at a rate not exceeding 1000 g/h, intended for use with liquefied petroleum gases at 2.942 KN/m<sup>2</sup> ( 30 gf/cm<sup>2</sup> ) gas inlet pressure.

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\*General requirements for domestic and commercial equipment for use with LPG ( *second revision* ).

†Rules for rounding off numerical values ( *revised* ).



## **IS : 11480 - 1985**

**1.2** Requirements for controls or accessories given in this standard relate to those fitted as part of, or supplied with, particular appliances; they do not necessarily provide a complete specification for controls intended for general use and tested separately.

**1.3** For convenience, this standard has been divided into three sections as follows :

Section 1      Construction

Section 2      Performance

Section 3      General

### **SECTION 1 CONSTRUCTION**

#### **2. TERMINOLOGY**

**2.1** For the purpose of this standard, the relevant definitions given in IS : 6480-1971\* shall apply. In addition, the definition given in 2.2 shall also apply.

**2.2 Grill Area** — The area over which 75 percent of the browning is uniform.

#### **3. GENERAL**

**3.1** In addition to the relevant requirements given in 3 of Section 1 of IS : 5116-1985†, the requirements given in 3.2, shall apply.

**3.2** No pressure regulator shall be included as a part of the griller.

#### **4. MATERIALS**

**4.1** In addition to the relevant requirements given in 4 of Section 1 of IS : 5116-1985†, the requirements given in 4.2 to 4.4 shall apply.

**4.2** Material for griller burner where food is placed under it shall be of non-corrosive material, shall have melting point above 800°C and treated to withstand corrosion during normal use.

**4.3** Grill trays and grid shall be made of non-corrosive material or appropriately treated to resist corrosion.

**4.4** Glass for grill door if provided shall be heat resistant.

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\*Glossary of terms relating to domestic and commercial gas burning appliances.

†General requirements for domestic and commercial equipment for use with LPG (second revision).

## 5. DESIGN FOR MAINTENANCE

**5.1** In addition to the relevant requirements given in 5 of Section 1 of IS : 5116 - 1985\*, the requirements given in 5.1 to 5.5 shall apply.

**5.2** Burner and burner parts of same capacity in the same model shall be replaceable without affecting performance.

**5.3** Parts which are intended to be removable by the user shall be easy to replace correctly and difficult to assemble incorrectly.

**5.4** All nuts, bolts and fittings having spanner flats shall be capable of being moved by suitable spanner or be readily accessible to an adjustable spanner.

**5.5** All controls and any other moving parts shall operate freely at the highest working temperature obtainable on the appliance.

**5.6** The appliance shall be free from sharp edges that are liable to damage clothing or cause injuries.

**5.7** The parts of the burner shall not get disconnected during operation of the appliance.

**5.8** Burner parts shall be so designed and located that in normal use spillage of food shall not cause internal fouling of mixing tube and or blockage of injector jet.

## 6. RIGIDITY AND STABILITY

**6.1** The grill shall be so designed that when assembled correctly and resting on a firm level foundation, it shall be in level and rigid, and if subjected to vibration, shall not rattle.

**6.2** The grill shall be so designed that it cannot be inadvertently overturned.

## 7. WORKMANSHIP AND FINISH

**7.1** In addition to the relevant requirements given in 6 of Section 1 of IS : 5116-1985\* the requirements given in 7.2 to 7.3 shall apply.

**7.2** All components made of materials susceptible to corrosion shall be given a corrosion-resistant protective finish appropriate to the conditions of use. The protective coating for external surfaces shall be resistant to temperatures up to 150°C.

**7.3** Plastic components that are liable to heating such as tap handles, push buttons, etc, shall not show signs of deterioration when tested in accordance with the method given in Appendix A.

\*General requirements for domestic and commercial equipment for use with LPG ( second revision ).

## **IS : 11480 - 1985**

**8. Gas Taps** — The relevant requirements given in 7 of Section 1 of IS : 5116-1985\* shall apply.

### **9. INJECTOR JETS**

**9.1** The relevant requirements given in 8 of Section 1 of IS : 5116-1985\* shall apply.

### **10. BURNERS**

**10.1** The relevant requirements given in 9 of Section 1 of IS : 5116-1985\* shall apply.

### **11. BURNER SUPPORT**

**11.1** Burner support or any accessory, if provided, shall not interfere in the functioning of the burner and or burner ports.

### **12. DRIP TRAYS**

**12.1** Every grill shall be equipped with a drip tray or other adequate means to catch water or other substances falling or dripping through openings in grates.

**12.2** Drip trays or other means provided to serve the same suction shall be constructed of a corrosion-resistant material or have a corrosion-resisting finish.

**12.3** Drip trays, when provided, shall have no sharp edges or corners. They shall be easily removable without tools when hot and easily accessible for cleaning.

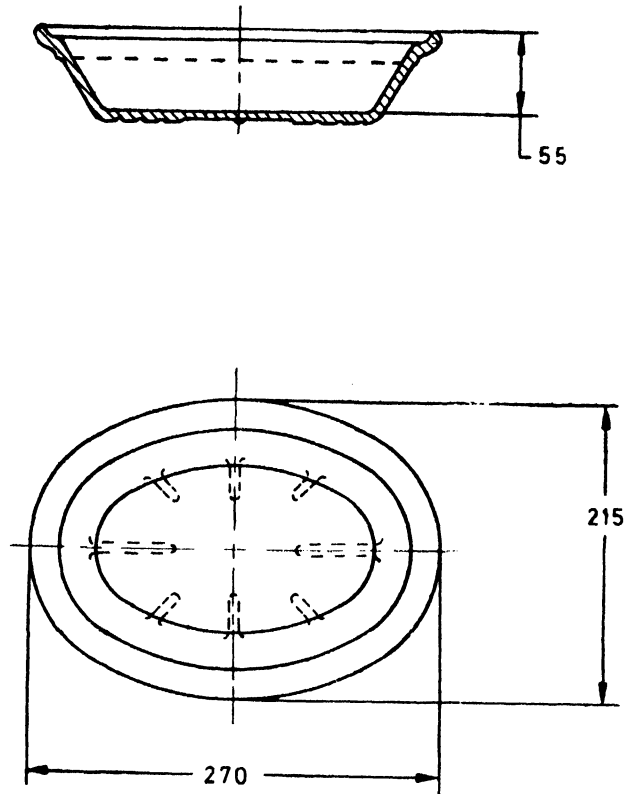
### **13. GRILL DESIGN**

**13.1** There shall be adequate clearance between the grill and the tray beneath it to allow for satisfactory grilling and the insertion of a pie dish having dimension covered in Fig. 1.

**13.2** The height of the grill pan grid shall be adjustable to two or more positions.

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\*General requirements for domestic and commercial equipment for use with LPG ( *second revision* ).



All dimensions in millimetres.

FIG. 1 PIE DISH

#### 14. GAS SOUNDNESS

**14.1** The relevant requirements given in **15.1** of IS : 5116-1985\* shall apply.

#### 15. STRENGTH AND RIGIDITY

**15.1** When tested as specified in Appendix B, the vertical resultant deflection of the top surface measured at the centre of length of the body, shall not exceed 4 mm and the distance between the opposite sides ( lengthwise and widthwise ) shall not change by more than 5 mm.

\*General requirements for domestic and commercial equipment for use with LPG ( second revision ).

## **SECTION 2 PERFORMANCE**

### **16. GENERAL CONDITIONS OF TEST**

**16.1** The relevant requirements given in **18** of Section 2 of IS : 5116-1985\* shall apply.

### **17. GAS CONSUMPTION**

**17.1** In addition to the relevant requirements given in **19** of Section 2 of IS : 5116-1985\* the requirements given in **17.2** shall apply.

**17.2** When the gas consumption of burner is reduced to simmer the flame shall not extinguish, blow off, strike back or form soot when tested with commercial LPG ( marketed in 11 to 15 kg LPG capacity cylinders ) at  $2.942 \text{ kN/m}^2$  (  $30 \text{ gf/cm}^2$  ) gas inlet pressure.

### **18. IGNITION AND FLAME STABILITY**

**18.1** In addition to the relevant requirements given in **20** of IS : 5116-1985\* the requirements given in **18.2** and **18.3** shall apply.

**18.2** There shall be easy and safe access for lighting and re-lighting each burner by a match stick and it shall be easy to see that the burner is lighted. Where the burner is lighted by automatic ignition or battery or flint operated or by a pilot flame it shall not be possible for gas to be admitted to the main burner without being smoothly ignited by a pilot flame. Each burner should be at room temperature at the start of each test and should be tested in turn.

**18.3** If the flame is applied to any of the burner ports when the gas is flowing, flame travel shall be complete. This applies for all pressures from  $2.452$  to  $3.432 \text{ kN/m}^2$  (  $25$  to  $35 \text{ gf/cm}^2$  ) taps being fully open, and without a pan over the burner.

### **19. NOISE CONTROL**

**19.1** The ignition of the burner flames, their operation and turning OFF shall not give rise to undue or excessive noise during all the operation tests.

### **20. FLASH BACK**

**20.1** There shall be no flash back when griller is switched off after it has remained lighted in full 'ON' position for a period of 30 minutes at a nominal pressure of  $25$  to  $35 \text{ gf/cm}^2$ .

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\*General requirements for domestic and commercial equipment for use with LPG (second revision ).

## 21. RESISTANCE TO DRAUGHT

**21.1** There shall be no extinction of flame on any of the burners operating at maximum consumption when the appliance is placed in a general ( not localized ) current of air with a velocity of 2 m/s as measured with a rotating vane anemometer. The location of the appliance relative to neighbouring walls and the direction of the draught shall be varied to correspond to likely conditions of appliance installations when door opens. This applies for all pressure from 2.452 to 3.432 kN/m<sup>2</sup> ( 25 to 35 gf/cm<sup>2</sup> ).

## 22. PERFORMANCE TEST

**22.1** When tested as described in Appendix C the total time taken to toast three successive loads including times of loading and unloading shall not exceed 11.5 minutes. For this test, Test Gas A or its substitute as obtained by the method given in **18.4.1.1** (b) of IS : 5116-1985\* shall be used.

**22.2 Formation of Soot** — During normal operation the flames shall not deposit soot in sufficient quantities to affect the appearance or performance of the appliance. When the performance testing is completed the appliance shall be examined for evidence of sooting.

**22.3 Tests for Individual Features** — Where the manufacturer claims that a grill is suitable for a specified type of cooking, appropriate tests shall be agreed to between the manufacturer and the testing authority.

## 23. COMBUSTION

**23.1** When tested according to the details laid down in Appendix D, on no account the carbon monoxide/carbon dioxide ratio of exhaust gases of any appliance operating at any consumption at which the flame is stable at gas inlet pressure from 2.452 to 3.432 kN/m<sup>2</sup> ( 25 to 35 gf/cm<sup>2</sup> ) shall exceed 0.02. The carbon monoxide and carbon dioxide contents of the products of combustion shall be determined by the methods capable of accuracy of 0.001 percent and 0.5 percent respectively of the volume of the sample. This test need not be performed on burners with a gas rate of less than 201/h at 2.942 kN/m<sup>2</sup> ( 30 gf/cm<sup>2</sup> ) gas inlet pressure.

## 24. FIRE HAZARD AND LIMITING TEMPERATURES

**24.1 Floor, Wall and Ceiling Temperatures**— Appliances installed on or near walls and floor as intended for normal use shall not give rise in operation to wall, floor or ceiling temperature in excess of 65°C above the room temperature after 2 hours operation. This requirement shall be tested by the method given in Appendix E.

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\*General requirements for domestic and commercial equipment for use with LPG ( second revision ).

## **IS : 11480 - 1985**

**24.2 Surface Temperatures** — When operated as described in 24.1, no portion of the surface of the appliance, other than a working surface, likely to be accidentally touched shall exceed 120°C ( working surfaces include pan supports, and grill covers ).

**24.2.1** Surfaces which in normal use have to be touched for short periods ( for example, tap handles ), shall not have a temperature exceeding 60°C.

**24.2.2** The temperature of synthetic rubber diaphragm in gas carrying components shall not exceed 60°C.

## **25. THERMAL EFFICIENCY OF BOILING BURNERS**

**25.1** The requirements given in 25.1 and Appendix B of IS : 4246-1984\* shall apply.

## **26. CLASSIFICATION OF TESTS**

**26.1 Type Tests**— The following shall constitute type tests:

- a) Gas consumption ( *see* 17 );
- b) Resistance to draught ( *see* 21 );
- c) Combustion ( *see* 23 );
- d) Fire hazard and limiting temperatures ( *see* 24 );
- e) Toasting performance ( *see* 22 );
- f) Strength of appliance ( *see* 15 );
- g) Flash back test for materials of burners ( *see* 4.2 and Appendix A of IS : 5116-1985† ); and
- h) Thermal efficiency of boiling burners ( *see* 25 ).

## **27. ROUTINE TESTS**

**27.1** The following shall be carried out as routine tests :

- a) Gas soundness ( *see* 14 );
- b) Ignition and flame stability ( *see* 18 );
- c) Noise control ( *see* 19 );
- d) Flash back ( *see* 20 ); and
- e) Formation of soot ( *see* 22.2 ).

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\*Specification for domestic gas stoves for use with liquified petroleum gases ( *third revision* ).

†General requirements for domestic and commercial equipment of use with LPG ( *second revision* ).

## **SECTION 3 GENERAL**

### **28. INSTRUCTIONS**

**28.1** The appliance shall be accompanied by an instruction card giving the following information:

- a) Brief instructions for installation and regulation which includes piping and sitting of terminals, if any;
- b) Rating of the burner in g/h ( l/h ) ( with commercial butane );
- c) Instructions for the correct operation of the appliance; and
- d) Name of the parts.

### **29. MARKING**

**29.1** Each appliance shall be legibly and indelibly marked with the following :

- a) Manufacturer's name, initials or registered trade-mark;
- b) Total gas consumption in g/h ( l/h );
- c) Rating of the burners in g/h ( l/h );
- d) Grill area;
- e) Any special instructions for safe use of the appliance;
- f) For use with LPG at 2.942 kN/m<sup>2</sup> ( 30 gf/cm<sup>2</sup> ); and
- g) Country of origin.

**29.1.1** The griller may also be marked with the ISI Certification Mark.

**NOTE** — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

### **30. PACKING**

**30.1** The griller shall be packed as agreed to between the purchaser and the manufacturer.



## APPENDIX A

( Clause 7.3 )

### METHOD OF TEST FOR PLASTICS COMPONENTS

#### A-1. METHOD

**A-1.1** The test shall be made in a dry products free heating cabinet. Where the plastics is integral with, pushed on or secured to another component, the stressed condition shall either be simulated or, where practicable, the plastics part shall be assembled to the mating component.

**A-1.2** Visually inspect the component to establish its initial condition. Place the stressed component in the cabinet for a continuous period of 48 h at a temperature of 60°C, after which inspect it again.

**A-1.3** If during the final examination it is observed that the plastics part has sustained any fissures, distortion, blemishes or discolouration it shall be deemed to have failed.

## APPENDIX B

( Clause 15.1 )

### STRENGTH AND RIGIDITY TEST

#### B-1. PROCEDURE

**B-1.1 Test Procedure** — The rubber support ( grommet ), if any, shall be removed and replaced with identical metal supports. The pan supports and the boiling burners shall be removed and the distance between the sides of the appliance body being tested shall be measured. A reference reading at the top surface of the body at the centre of the length shall be taken. A load of 500 newtons ( 50 kg ) shall be applied if the appliance comprises of griller only or a griller and two boiling burners with centre to centre distance of two boiling burners up to and including 400 mm. A load of 750 newtons ( 75 kg ) shall be applied to the griller with centre to centre distance between 2 boiling burners is more than 400 mm. The load shall be applied without impact to a strip of steel having 20 mm thickness, 100 mm width and as long as the width of the appliance. This strip shall be placed in the centre of the top surface of the appliance and its length parallel to the front. The load shall be maintained for 5 minutes after which the measurement for deflection at top surface of body ( at the centre of the length just in front of the strip ) shall be taken with the load in position.

## APPENDIX C

( Clause 22.1 )

### METHOD FOR TOASTING PERFORMANCE TEST

#### C-1. PROCEDURE

**C-1.1** Machine-made white bread conforming to IS : 1483-1979\* or any other good quality bread, one-day old, shall be cut into slices 12 mm thick and crusts shall be removed to not less than 6 mm from each edge.

**C-1.2** The grill shall be arranged in the recommended position and completely covered with slices of bread; if parts of slices are to be used, they shall be placed at the centre rather than of the outside of the grid. Three such loads shall be prepared and the meter read. The first load shall be placed centrally under the grill. The gas shall be lighted and a stopwatch started. The pan shall be withdrawn as soon as any part of the load is well browned, but before burning commences.

**C-1.3** During the next 25 seconds the slices shall be turned over on the grill grid ensuring that the outer edges are placed over the edges of the grill grid. Any loss of area due to shrinkage shall be accounted for by space between the slices.

**C-1.4** The grill pan shall be reinserted at the end of 25 seconds and the other side toasted. After a 15-second interval a load shall be changed and a second load shall be toasted in the same way, and then a third load. At the end of the third load the gas shall be turned 'OFF' the watch stopped and the meter read.

**C-1.5** The area in square centimetres over which the bread is browned ( it usually approximates to a circle or rectangle ) shall be determined. This shall be done for both sides of all three loads keeping the outer edges of the bread always to the edges of the grid.

**C-1.6 Toasted Area** — Except for small appliances of grill grid area less than 325 cm<sup>2</sup> and table appliances the toasted area shall be not less than 200 cm<sup>2</sup>. There shall be no marked inequality of browning on the surface of the toast.

#### C-2. GAS CONSUMPTION

**C-2.1** When tested as indicated in C-1, the gas consumption shall not exceed the value given by the following formula:

$$P = 0.9A + 315$$

where

*P* is the permitted consumption of gas in kilocalories, and

*A* is the toasted area in square centimetres.

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\*Specification for white bread ( second revision ).

## APPENDIX D

( Clause 23.1 )

### METHOD FOR DETERMINATION OF CARBON MONOXIDE/ CARBON DIOXIDE RATIO

#### D-1. PROCEDURES

**D-1.1** The relevant requirements given in 18 of Section 2 of IS : 5116 - 1985\* shall apply. In addition, however, a collecting hood suitable for the burners under examination shall be obtained. The hood shall be so designed that while not interfering in any way with the normal combustion of the burner, it collects a fairly high proportion of the products of combustion. Also, it shall be such that the sample collected represents the whole of the combustion gases and not those from one particular point. A suitable collecting hood for boiling burners is shown in Fig. 2. For grillers a special sampling hood is shown in Fig. 3. When using this hood, the damper provided shall be set or additional flue pipe added, so that spillage of the flue gases around the skirt is just prevented. With the sampling hood in position over the burner under investigation, Test Gas A at inlet pressure of  $2.452 \text{ kN/m}^2$  (  $25 \text{ gf/cm}^2$  ) shall be admitted and the burner operated for a few minutes before sampling is commenced. The reason for this being that during the first few minutes the burner is warming up and the proportion of carbon monoxide may be high. However, this is not dangerous provided the burner works satisfactorily after heating up.

## APPENDIX E

( Clause 24.1 )

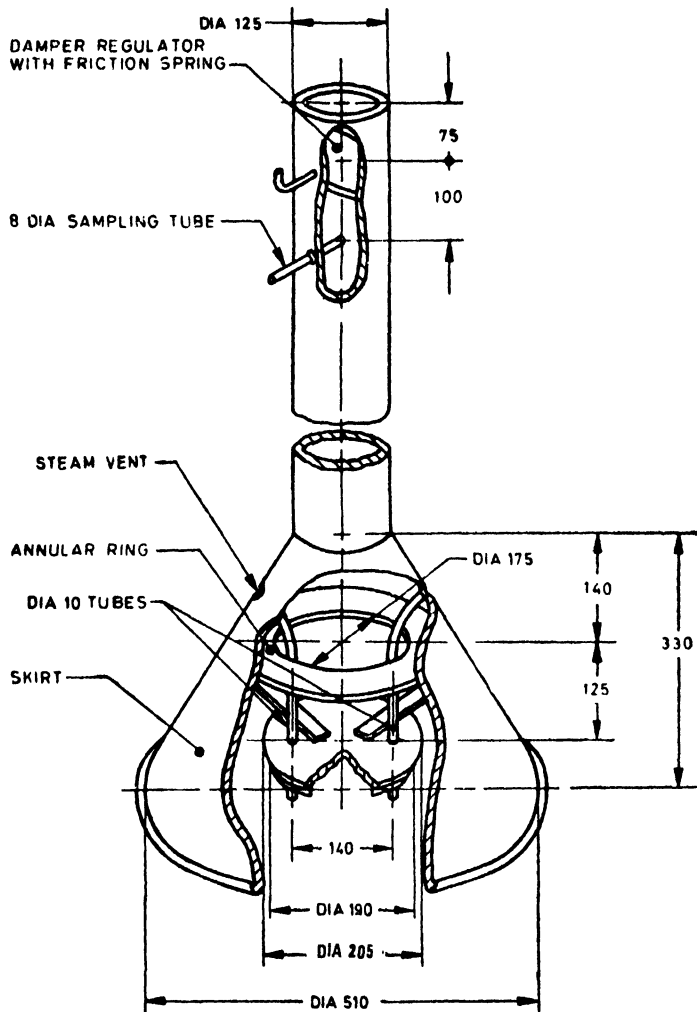
### METHOD FOR MEASUREMENT OF FLOOR WALL AND CEILING TEMPERATURES

#### E-1. APPARATUS

**E-1.1** The apparatus shall consist of a wooden floor with side and back walls ( *see* Fig. 4 ). The floor shall be approximately 5 cm thick and consist of a 2.5 cm layer of pine below a 2.5 cm layer of any timber with natural colour nearing white or off-white finished in

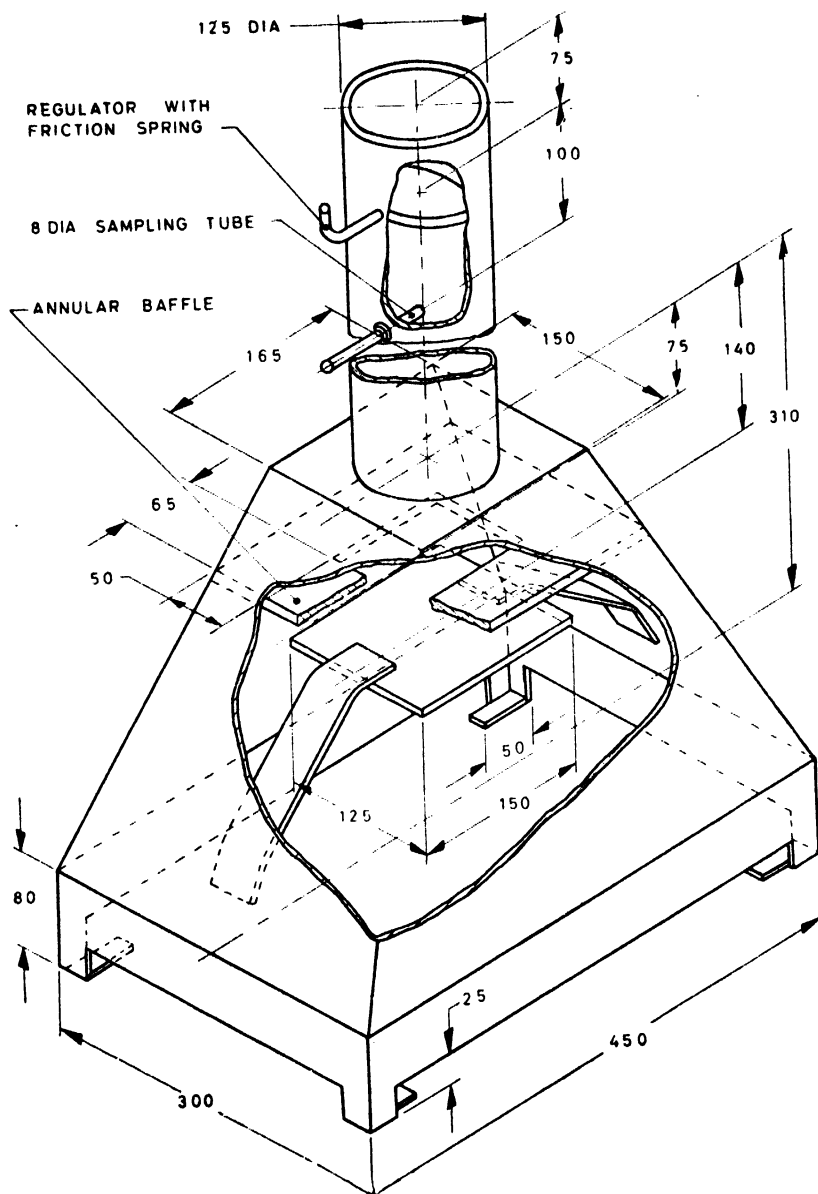
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\*General requirements for domestic and commercial equipment of use with LPG ( *second revision* ).



All dimensions in millimetres.

FIG. 2 HOOD FOR BOILING BURNERS



All dimensions in millimetres.  
**FIG. 3 HOOD FOR GRILLERS**

clear varnish with a thickness of building paper between them. Both the side and back walls shall be of 2.5 cm pine and painted dull black. The apparatus shall be large enough to accommodate almost any appliance, and the side wall shall be detachable so that measurement can be made, if necessary, against both sides of the appliance.

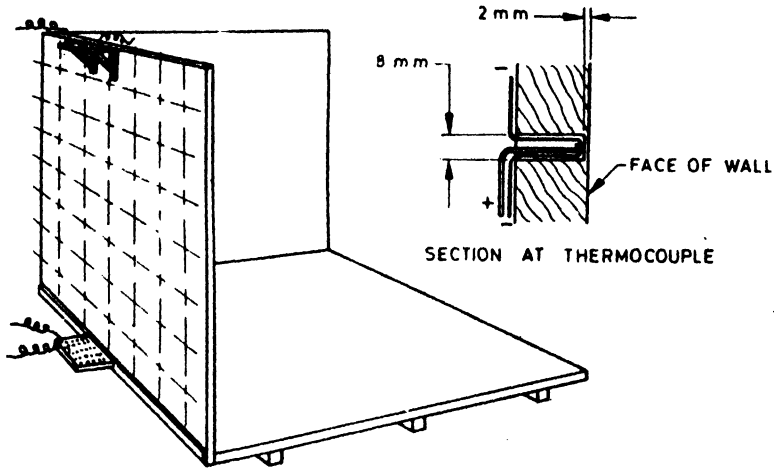


FIG. 4 APPARATUS FOR MEASURING FLOOR, WALL AND CEILING TEMPERATURES

**E-1.2** Thermocouples shall be embedded in each panel at 15 cm intervals and in such a way that the junctions are fixed in position 2 mm from the wood surface. They shall be conveniently inserted in holes of 8 mm diameter with a thermojunction bent at a right angle and sealed in position with insulating cement. It shall be necessary to arrange for successive readings to be made from each thermojunction. A convenient method of doing this is to connect all terminals of one sign to a single terminal and each terminal of the opposite sign to a separate terminal of a switchboard. Readings of the emf generated at the thermojunction shall be made by means of a suitable instrument, preferably potentiometer.

## E-2. PROCEDURE

**E-2.1** Before commencing tests with a new apparatus dry it out thoroughly either by previous test or by heating it for 24 hours with an appliance in position and operating at maximum gas rate in order to dry out the wood and secure reproducible results. The procedure is not necessary in subsequent tests.

**E-2.2 Floor and Wall Temperatures** — Arrange the appliance under examination so that it is as close as possible to the side and back walls of the apparatus described in E-1.1, taking note of the manufacturer's installation instructions. Light all the burners and place an 18 cm diameter vessel ( with lid ) containing about 2 kg water on each top burner. As soon as the water in the vessel boils, reduce the gas rate so that it is just kept boiling. Measure the floor and wall temperatures at the junctions most affected by the heat of the appliance after two hours of operation and at any intermediate times from the initial lighting if it is considered that certain local temperatures have then reached at maximum.

**E-2.3 Ceiling Temperature** — Raise the back panel and use the side panel as 'ceiling' resting on the top edge of the raised back panel and support at front edge by convenient stand. Operate the appliance as described in E-2.2 and record the temperature on the ceiling panel supported one metre above the top of the appliance.



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